

About This Topical Issue...

In the industrial society in which we live there is a growing need for rather complex measurement techniques to characterize the properties of materials and manufactured articles and their defects both during production and in actual use. Successful implementation of these techniques requires both a basic understanding of the physical processes involved in such measurements and theoretical models which relate measured quantities to actual material properties.

Current NBS efforts in this area are represented by the seven papers of this topical issue on "Scientific Aspects of Non-Destructive Evaluation." These papers reflect three different types of research. Three of them deal with new experimental techniques. Laser light scattering (Vorburger *et al.*) provides an attractive alternative technique to stylus measurements as a probe of surface roughness. Small angle neutron scattering (Hardman-Rhyne *et al.*, Fields *et al.*) may be used as a unique probe of the internal structure of materials which can provide reference standards for intercomparison with more conventional non-destructive evaluation techniques. Three articles (those by Kahn, Simmons and Wadley and Norton *et al.*) are not concerned directly with measurement but deal with the development of mathematical models which will relate observed signals in electromagnetic, acoustic emission and ultrasonic measurement systems to internal properties or defects in materials. The development of such models is an important part of the science of measurement. The last article (Eitzen and Wadley) is of yet a different type. It is concerned with the problem of acquiring a basic understanding of the acoustic emission technique.

The seven papers in this issue, although they are representative, reflect only a small fraction of current research activities at NBS in the areas of non-destructive evaluation. Other articles will appear in following issues.

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for the Board of Editors